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the discovery and measurement of double stars has been so rapid since 1906 that an extension of this catalogue is already demanded. Such an extension was planned by Professor Eric Doolittle, at Burnham's request, and had been carried well toward completion before his untimely death, in September, 1920. In fulfilment of my promise to Professor Doolittle, I have undertaken to complete this work and all the data, including Burnham's extensive collection of double star literature, have accordingly been sent to me.

The material has been classified and arranged for convenient reference and considerable progress has been made in bringing the card catalogue (which will finally contain some 20,000 numbers) up to date. I am now in position to offer lists of stars specially worth remeasuring to any observers who wish to cooperate in making the catalogue as valuable as possible. It is estimated that it will require at least three more years to complete the work and prepare the manuscript for the printer.

ROBERT G. AITKEN.

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#### ON THE ZODIACAL LIGHT\*

(Abstract)

Photometric observations of the Zodiacal Light show rapid changes in the brightness sometimes from day to day. The bright and the faint parts show an opposite tendency to approach and to recede from the Sun. Frequently a marked bifurcation is observed. A seasonal change from a prominent morning to a prominent evening phenomenon towards the end of the year is found to be sometimes very abrupt sometimes more gradual.

The Zodiacal Light is in continuous connection with the Counter-glow if this is visible. The decrease in intensity from the Sun is in accordance with the assumption of constant density in a cylindric beam directed towards the Sun. This places the Counter-glow as an illumination effect of matter in opposition to the Sun at a distance of some astronomical units. The Counter-glow has also seasonal changes independent of its apparent position with respect to the Milky Way and the terrestrial latitude of the observer.

The shadow effect along the bright cone of the Zodiacal Light and the phase effect in the Counter-glow point to considerable density and size of the particles. This is not contradicted by the scarcity of meteors colliding with the Earth, because of the restricted extension of the zodiacal beam which is not exactly in the

ecliptic and thru which the Earth does not generally pass. But on the other hand it is in good accordance with the apparent disks of shooting stars when observed in the telescope. The shape and the mass of the matter in the Zodiacal Light might thus be able to produce at least some of the disturbing effects observed in the orbits of the planets. The phenomenon of the Zodiacal Light has a sufficiently diversified character to explain most of the very discordant observations but continued observations ought to be directed towards all the aspects of this—the giant and nebular phenomenon of the solar system.

H. THIELE.

Mount Hamilton, July, 1921.

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RECENT OBSERVATIONS OF THE GREEN BANDS IN THE SPECTRUM  
OF NOVA AQUILAE No. 3\*

(Abstract)

Spectrograms of *Nova Aquilae* No. 3 have recently been secured by Dr. Lundmark and the writer for the purpose of recording the form of the green nebular bands,  $N_1$  and  $N_2$ . A comparison of these spectrograms with the ones obtained in 1919 and 1920 shows that conspicuous changes in the distribution of the light in the bands have occurred in the interval of two years. Since 1919 the extreme violet and red maxima have increased in intensity with corresponding decrease in intensity of the central maxima.

The bands still show the peculiar sinuous appearance when the slit of the spectrograph is placed along the diameter of the nova disk in position angle  $202^\circ$ , and the symmetrical form for the slit in position angle  $112^\circ$ .

The extreme violet and red maxima, which, on the spectrograms of 1919 and 1920, were displaced 29 angstroms from the normal positions of the nebular lines, now show a smaller displacement by about 1.3 angstroms.

On the spectrogram of June, 1921, the  $N_1$  and  $N_2$  bands correspond to an image disk of  $5''.0$  in diameter.

A comparison of the observed diameters of the nova disk in 1918 to 1921 indicates that the green disk is expanding at a continually decreasing rate.

Difficulties in the interpretation of the displacements of the maxima in the bands as due to the radial velocity of an expanding